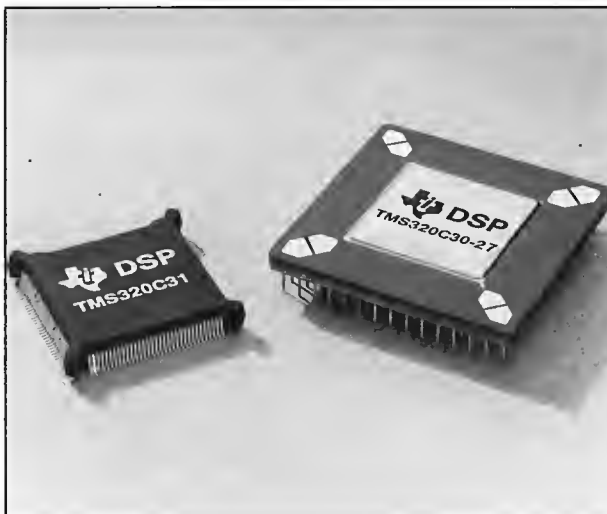# TMS320C31, TMS320C30-27
DIGITAL SIGNAL PROCESSORS

- ■ Floating-point DSP performance at fixed-point prices

- ■ 10X improvement in dynamic range over fixed point DSPs eliminates numerical scaling

- ■ Leading-edge C development environment supports multiprocessing/multitasking applications

- ■ Cost-effective solutions for multimedia, 3D graphics, datacom and embedded control applications

- ■ Compatible with the industry-standard TMS320C30

Floating-Point Performance That Everyone Can Afford

Designers now have a cost-effective alternative to using fixed-point processors in DSP applications. The TMS320C31 and TMS320C30-27 bring high-performance floating-point solutions to cost-sensitive applications. These devices allow the user to increase system performance while realizing the benefits of increased accuracy, elimination of numerical scaling, and programming/debugging in high-level languages such as C and Ada.

The TMS320C31 is the first spin-off product in the TMS320C3x floating-point family. In production volumes, the TMS320C31 will be priced under $40. Based on the highly-parallel, register-based TMS320C30 core CPU, the TMS320C31 contains a subset of the peripheral and memory interface options of the TMS320C30. This single 32-bit data bus device will be offered in 33 and 27 MFLOP versions. The TMS320C31 is a cost-effective bridge from today's fixed-point DSPs to higher-performance floating-point DSPs, and provides an object-code compatible upgrade path to even higher performance solutions. Samples are planned for 4Q90.

The TMS320C30-27 is a lower speed, pin and object-code compatible version of the TMS320C30. Priced under $100 in volume, the TMS320C30-27 is available now. Running at 27 MFLOPS, TMS320C30 designs can realize an immediate system cost reduction by using slower off-chip memories with this low-cost device.
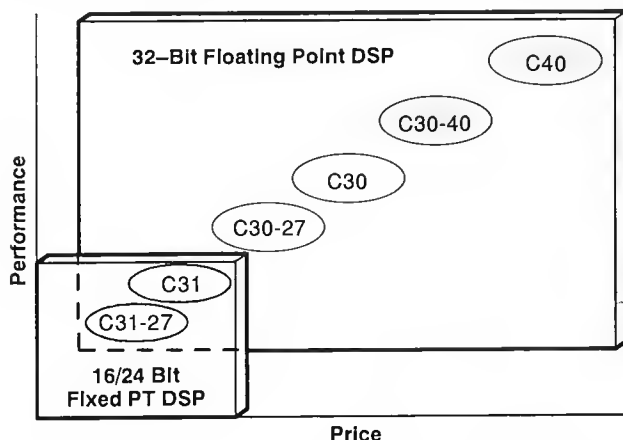
Solutions, Not Compromises

TI offers the industry's most extensive family of floating-point DSPs. Ranging from the low-cost TMS320C31 to the high-performance 33 MFLOP TMS320C30, there is a TMS320 floating-point DSP to fit the cost/performance needs of most applications. And because they are object-code compatible, future performance increases or system cost reductions can be accomplished while preserving the user's software investment.

## When 16 Bits Isn't Enough, Floating Point is the Answer

Numerical scaling is commonly used to overcome the limited dynamic range of fixed-point processors. This technique compromises numerical accuracy and system performance. Floating-point representation eliminates the need for scaling while improving accuracy and algorithm performance. Code development also becomes faster and easier since scaling is no longer required.

Benefits of Using Floating-Point DSPs

Designed to efficiently run high-level language code, the industry-standard TMS320C30 CPU core is the cornerstone of TI's floating-point DSP family.

TMS320C3x Benefits:

- High level of on-chip integration lowers overall system costs
- Concurrent DMA and parallel instructions deliver high performance/throughput
- On-chip cache enables use of slower memories (DRAM) without degrading performance
- High-level language engine enables faster algorithm development and debug

TMS320C3x BLOCK DIAGRAM
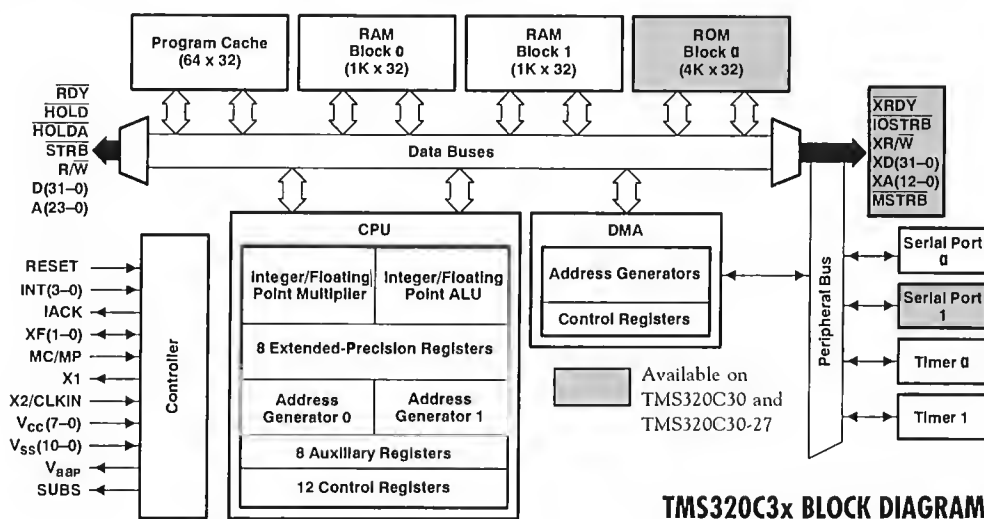
TMS320C3x Features:

- Highly parallel, multibus architecture
- Extended-precision floating-point ALU
- 8 extended-precision registers/accumulators
- 8 32-bit auxiliary registers
- 13 program control and interrupt registers
- 64-word instruction cache
- Concurrent DMA controller with dedicated bus

- Single-cycle execution
- Extended-precision floating-point hardware multiplier
- 2 independent address generators
- Block repeat/zero overhead looping
- 2K words dual-access on-chip SRAM for use as program, data or mixed memory

TMS320C3x Family Product Matrix

| Device | Cycle Time | On-Chip Memory | | Memory Space | Cache | External Data Buses | I/O | | | Package |
		RAM	ROM				Timers	Serial Ports	DMA	
TMS320C31-27	74 ns	2K x 32		16M x 32	64 x 32	1	2	1	Yes	132 PQFP
TMS320C31	60 ns	2K x 32		16M x 32	64 x 32	1	2	1	Yes	132 PQFP
TMS320C30-27	74 ns	2K x 32	4K x 32	16M x 32	64 x 32	2	2	2	Yes	181 CPGA
TMS320C30	60 ns	2K x 32	4K x 32	16M x 32	64 x 32	2	2	2	Yes	181 CPGA

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Enabling Tomorrow's Applications, Today

The TMS320C3x low-cost DSPs will enable the leading-edge technologies of tomorrow, including multimedia technology, PC and workstation 3D graphics, and the next generation of applications in the areas of telecom, datacom, servo control, automotive and military electronics. Offering high performance levels at affordable prices, TMS320C3x DSPs have opened the door to a host of new and exciting DSP applications in traditional and non-traditional markets.

Multimedia

As this technology evolves, multimedia will demand multitasking DSPs. Simultaneous processing and presentation of realtime audio, video and analog data demands high-performance CPUs with high throughput and multitasking capabilities. The TMS320C3x family's highly-parallel, general-purpose CPU is ideally suited for multitasking applications. The combination of this powerful CPU, TI's wealth of audio, telecom and datacom expertise, and the SPOX multitasking operating system delivers the ideal environment to develop multimedia solutions.
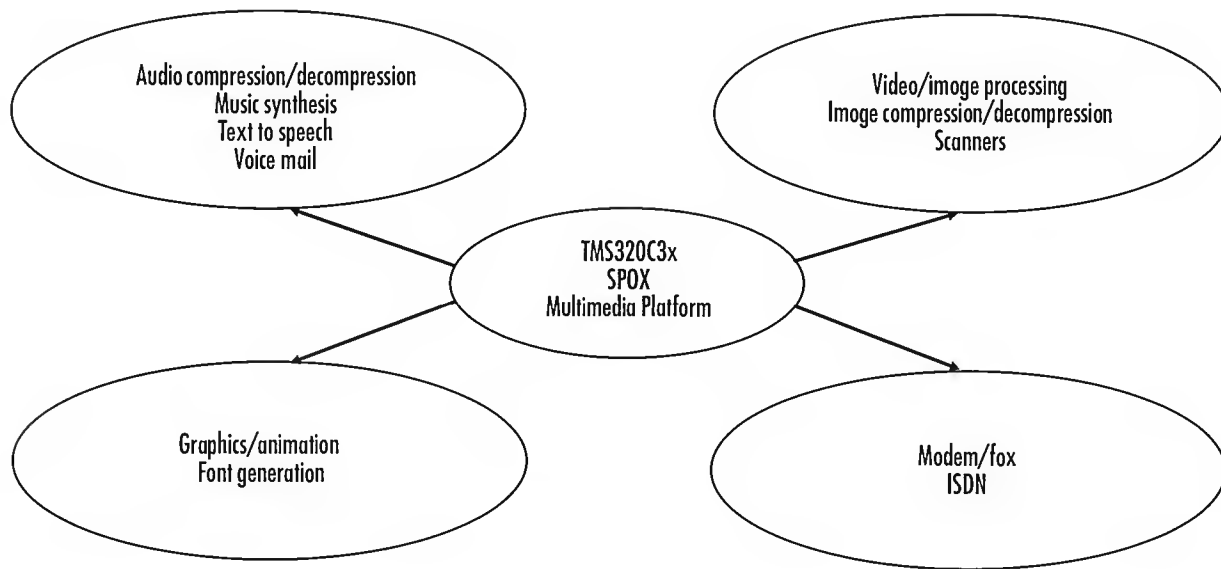

3D Graphics

The TMS320C3x DSPs command a large share of the 3D graphics market in the high-end workstation arena. By harnessing the multiprocessing power of the TMS320C30 for graphics engines, major workstation vendors have redefined the standard for 3D performance. With the introduction of the low-cost TMS320C31 and TMS320C30-27, today's high performance graphics workstation technology will quickly migrate into the more cost-sensitive desktop market. With their large on-chip memories, flexible peripherals and 33 MFLOP performance, the low-cost TMS320C3x DSPs will help speed this transition.

Anywhere Performance Counts - TMS320C3x

Cost-effective, high-performance DSP solutions are not unique to traditional DSP applications. DSPs are finding their way into applications previously reserved for microcontrollers and RISC processors. The general-purpose features and the high-performance DSP attributes of the TMS320C3x devices allow designers to achieve their cost/performance goals without sacrificing the ease-of-use and high-level language development environment associated with microcontroller or RISC solutions.

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The New Standard in Development Support

TI has raised the standard of support DSP designers should expect with the TMS320C3x development environment. Featuring the most desirable capabilities available in general-purpose microprocessor development, TI is the first and only DSP supplier to offer these capabilities for DSP design. These new capabilities provide the TMS320 designer the competitive edge to get a product to market in the fastest time possible.

**TMS320C3x
DEVELOPMENT
ENVIRONMENT**
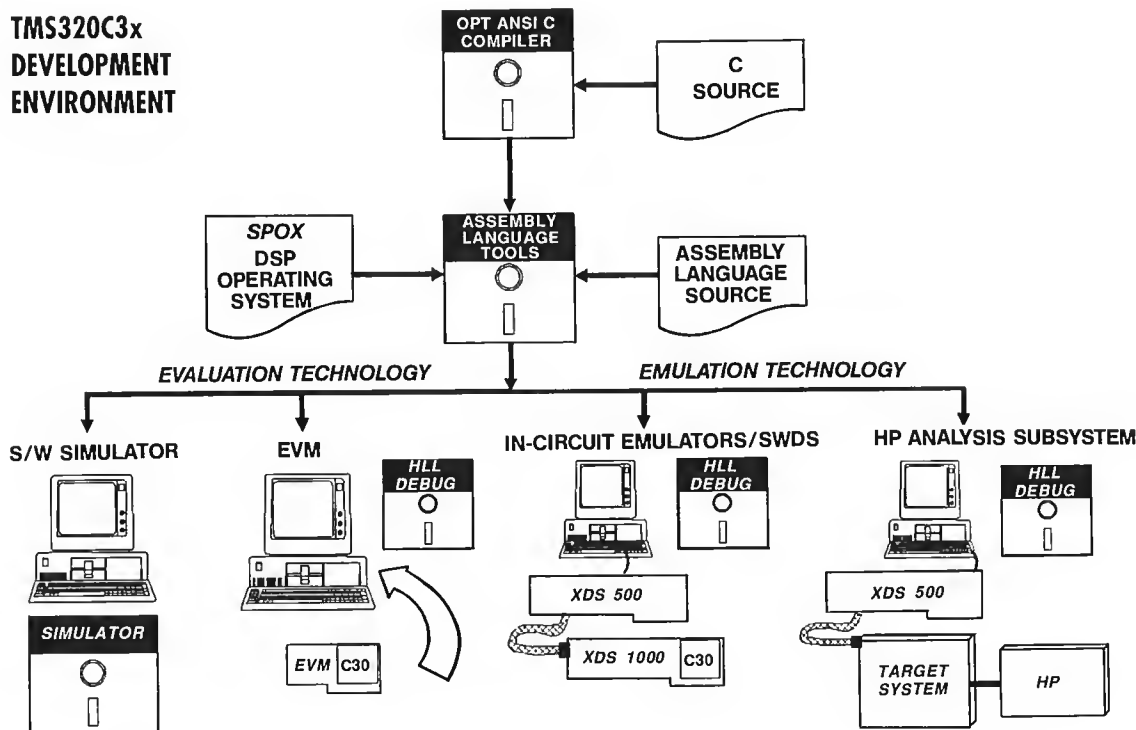
TI's Support Network - Your Competitive Edge

TI provides the most comprehensive support program in the industry. The TMS320 designer can rely on a technical hotline that services over 1000 calls per month, field application support, and over 2000 pages of application notes, including a new volume dedicated solely to TMS320C3x design. The extent and quality of support is indicative of TI's commitment to making the TMS320 designer a success in today's fast-moving market.

Start Development Now!

A complete TMS320C3x development environment exists now. To remove the cost barriers to evaluating and developing TMS320 floating-point applications, TI has introduced the TMS320C3x Evaluation Module (EVM). For less than $1,000, the EVM provides the ability to evaluate code in realtime while operating in the rich development environment of TI's C and assembly source level debugger. The EVM board contains a TMS320C30, 16K words of RAM and an A/D interface. The system comes complete with all the software required to begin application development on a standalone PC-AT host.

To order the TMS320C3x Evaluation Module, call your local TI Field Sales Office or authorized distributor today, and start designing exciting new applications with the TMS320 floating-point family.

The TMS320 family of DSPs includes more than twenty devices spanning five generations. These devices are used in a wide variety of applications and end products requiring high-speed, computation-intensive algorithms. For more information on the TMS320 DSP family, contact the TI Customer Response Center at (800)232-3200, x3510.

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